INVESTIGATION OF THE DIFFUSION OF ALLOYING ELEMENTS IN MULTI COMPONENT ALLOYS OF THE CR-NI SYSTEM USING THE PHOTOMETRIC ANALYSIS OF THE RADIATION BRIGHTNESS SPECTRA

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In this paper we consider the results of studying the diffusion of chromium and boron in an alloy G 35 (USA), in the chemical composition of which there were 12 elements. It should be noted that boron on the alloy passport was not specified, but its presence and concentration were established during the current study by the method of photometric analysis of structural images (PHASI), developed in IMET RAS. The method of PHASI is based on comparison according to the differential scheme of the spectra of the brightness of the reflection of visible light from the fragments of the surface of the object under study and their images before, during and after heating. The study was performed in situ in a high temperature metallographic microscope. The digital camera allowed in a periodic mode to register the image of the investigated fragment of the sample surface. Analysis of the data obtained by the PHASI method made it possible to establish the time and radial dependences of the partial derivatives of the concentrations of the first and second order alloying elements that appear in the diffusion equation. A complete analysis of the obtained experimental data made it possible to obtain temperature dependences of the diffusion coefficients of chromium and boron. The obtained values of activation energies of diffusion for these elements are close in magnitude to their estimates known from the literature data. The work was carried out according to the state assignment No 007—00129—18—00 and with the financial support of the Russian Foundation for Basic Research (grant No. 17—08——00098a).